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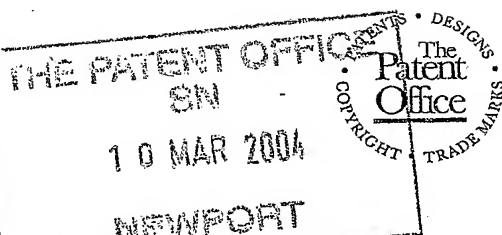
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1/77

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10 MAR 2004

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3. Full name, address and postcode of the or of
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Patents ADP number (*if you know it*)

If the applicant is a corporate body, give the
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8826075001

4. Title of the invention

PERSONAL SAFETY DEVICE

5. Name of your agent (*if you have one*)

"Address for service" in the United Kingdom
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Description 9

Claim(s) -

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Drawing(s) 1 + 1 5

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PERSONAL SAFETY DEVICE

The present invention relates to a device for ensuring safety. More particularly, but not exclusively, it relates to an easily transportable combination of a torch and a smoke alarm.

A frequent concern of campers, back packers and other travellers is that they might be caught up in a fire while sleeping, and be injured or killed. While most modern hotels will be provided with emergency lights and with permanently-installed and regularly maintained fire alarm systems linked to smoke detectors and the like, this may not be the case in hotels, guesthouses and the like in less-developed parts of the world, and is most unlikely to be the case on campsites, whether organised or ad hoc.

It is therefore desirable to provide a personal fire and smoke alarm that a traveller can easily carry with him or her and set up when required.

Once an alarm has been given, the traveller still needs to escape. Smoke may already be limiting visibility, it will often be night time, and any existing lighting systems may well

have failed (they may indeed be the cause of the fire in more ramshackle premises). The traveller will hence require his or her own source of light, such as a torch, immediately to hand.

Proposals have hence been made for portable smoke alarms with electric light sources built into their casings, such as that described in US Patent No. 4419658. However, while the device described therein could be deployed on a bedside cabinet or hooked over a headboard, it is not suitable for use as a torch to be carried by the traveller while searching for an escape route.

US Patent No. 4862148 discloses a device having the general configuration of a hand torch, with a smoke detector and associated alarm mounted to a butt end of the torch. This is a conveniently transportable item and can also be used as a conventional torch.

However, the device disclosed includes an exposed position of the smoke detector, which is enclosed in a cylindrical mesh housing, forming the butt of the device. The housing thus allows continuous access to the smoke detector by airborne particulates and vapours, whether or not the detector is actually switched on. As a result, if the device were to be used as a torch in a smoky area, for example near a campfire, smoke particles could enter the housing and linger, causing false alarms when the detector is subsequently turned on at a separate location.

The mesh housing may also reduce the device's usefulness as a torch. It is clearly most convenient to locate the smoke detector at an opposite end of the device to its lens and light

bulb (or other light source). However, the butt of a torch can be exposed to rough treatment, either accidentally or by being used as a base for the torch. The smoke detector thus risks being damaged. Also, particularly if the traveller is in a rural setting, the mesh housing could easily become blocked with mud or the like.

Indeed, a major drawback of the device shown in US 4862148 may well be that it is not waterproof. It might be dropped in a river, for example, or caught in the rain, leading to malfunction of electrical components.

One other drawback of the device shown in US 4862148 is the use of a simple on/off switch to control operation of the smoke detector. As a result, it may not be immediately obvious whether the detector has been switched on, and a user could inadvertently go to sleep, falsely relying on an inactive alarm.

It is hence an object of the present invention to provide a conveniently usable portable personal safety device, combining the full functions of torch and smoke alarm, while obviating the above disadvantages of existing devices.

According to the present invention, there is provided a personal safety device comprising casing means, a means of illumination and smoke detector means movable between a stored disposition within the casing means and an operative disposition extending externally of the casing means.

Preferably, the device is so configured as to be manually graspable.

Advantageously, the casing means comprises an elongate generally cylindrical housing with the illuminating means mounted to a first end thereof and the smoke detector means mounted adjacent a second end remote from the first.

The smoke detector means may then in its operative disposition extend axially outwardly from said second end of the housing.

The housing may be provided at said second end with end cap means to protect the smoke detector means when in its stored disposition.

The end cap means may then close the housing sealingly.

The end cap means may be mounted to the smoke detector means.

Preferably, the smoke detector means comprises photodiode smoke detection means.

Advantageously, the smoke detector means is mounted within chamber means having walls apertured to allow passage of air therethrough.

The smoke detector means may be provided with audible and/or visible alarm means, optionally so mounted thereto as to be disposed externally of the casing means in the operative disposition of the smoke detector means.

The smoke detector means may be provided with control means disposed within the casing means in either disposition of the smoke detector means.

The control means may be adapted to activate the smoke detector means when it is in its operative disposition and to inactivate it when it is in its stored disposition.

The control means may operate the alarm means in response to detection of smoke by the smoke detector means.

Optionally, the device may also be provided with means for a user to operate the alarm means, so that the device may then also be used as a personal attack or panic alarm.

The device is preferably provided with means to bias the smoke detector means towards its operative disposition, and selectably releasable catch means adapted to retain the smoke detector means in its stored disposition.

The device is preferably provided with internal electrical power supply means, such as electrical storage cell means.

The internal power supply means may be rechargeable .

The device may then be provided with recharging socket means extending through the casing means.

Separate internal power supply means may be provided for each of the illuminating means and the smoke detector means.

Alternatively, a single internal power supply means may power the illuminating means and the smoke detector means.

The device may be provided with support means, such as stand means, suspension hook means or the like.

The device may be provided with means to link it to a user's person or property.

An embodiment of the present invention will now be more particularly described by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a partially-sectioned side elevation of a safety device embodying the present invention, with smoke alarm functions in an operating configuration; and

Figure 2 is a partially-sectioned side elevation of the device shown in Figure 1, with smoke alarm functions in an inactive configuration.

Referring now to the Figures, and to Figure 1 in particular, a personal safety device 1 comprises a substantially cylindrical elongate outer casing 2, dimensioned to be conveniently graspable in one hand by a user. At a first end of the casing 2, there is provided a conventional torch arrangement comprising an incandescent electric light bulb 3 mounted within a reflector 4 behind a lens 5, so that it may project a beam of light generally axially of the cylindrical casing 2. A terminal portion 6 of the casing 2 is separable therefrom, for example to allow replacement of a defective bulb 3. The casing 2 may be of metal or a hard, strong plastics material, optionally coated with rubber or the like.

Three conventional dry cell electric batteries 7 are held within a central portion of the casing 2, and provide power to the bulb 3. A conventional on/off switch arrangement 8 is provided to operate the device 1 as a torch. The batteries 7 may be rechargeable batteries, in which case a sealable recharger socket is provided in the casing 2, linked to a conventional charging circuit (not shown).

At a second end of the casing 2, remote from the first, is provided a smoke alarm arrangement. A louvered cylindrical chamber 9 contains a photodiode smoke detector of known form. Adjacent this is mounted an audible alarm sounder 10. Each of the smoke detector and the alarm sounder 10 is operatively connected to a smoke detector circuit 11, and all three are mounted to a frame 12, which is longitudinally slideably moveable within the casing 2. In an operating configuration, as shown in Figure 1, the louvered chamber 9 and the sounder 10 are disposed externally of the casing 2, while the circuit 11 remains protected therewithin. In this embodiment, the smoke detector arrangement is powered by the batteries 7, although a dedicated battery may be provided if preferred.

A robust butt cap 13 is mounted to an end of the chamber 9 remote from the casing 2. An O-ring seal 14 is disposed in an annular recess encircling the butt cap 13.

In an inactive configuration, as shown in Figure 2, the frame 12 has been displaced inwardly of the casing 2, such that the circuit 11, sounder 10 and chamber 9 are all disposed within the casing 2. The butt cap 13 closes the second end of the casing 2, the O-ring seal 14 contacting a rim of the casing 2 to provide a watertight seal.

In the operating configuration shown in Figure 1, air may pass freely through the louvers of the chamber 9. Smoke particles would be registered by the smoke detector therewithin, which would pass a signal to the detector circuit 11. Once a predetermined critical concentration of smoke particles is reached, the circuit 11 causes the alarm sounder 10 to operate, alerting the user. In some embodiments, the bulb 3 is also automatically switched on.

When the smoke alarm is not required, the user pushes the butt cap 13 towards the casing 2. A latch (not shown) is provided to hold the frame 12 in place once it has reached the position shown in Figure 2. The smoke detector circuit 11 is automatically switched off once the frame 12 has been pushed home in this way.

The latch is released by twisting the butt cap 13 by a quarter turn. The frame 12 is biased outwardly of the casing 2 by a spring (not shown), so the device 1 then returns to the operating configuration shown in Figure 1, and the smoke detector circuit 11 is automatically switched on, once more.

Hence, if the chamber 9 is exposed, the smoke alarm arrangement is operating. A user can thus tell at a glance whether he is being protected by an operational alarm.

When the device 1 is in its inactive configuration, as shown in Figure 2, it is fully usable as a conventional, robust, waterproof torch. Neither water nor other adventitious material can enter the chamber 9 or reach the smoke detector circuit 11. The chamber 9 and the smoke detector therein are securely shielded from physical damage by the casing 2 and the butt cap

13. It is however the work of a moment to set up the device 1 as a smoke alarm by returning it to its operating configuration.

The device 1 is the same diameter as and very little longer than a conventional torch, and the smoke detector arrangement adds little to its overall mass. The device 1 is thus equally as easy to transport and to handle.

The device 1 may optionally be provided with loops or hooks to allow it to be hung from a belt or pack in transit or from a convenient support when in use as a smoke alarm. It may also be stood on end with the terminal portion 6 of the casing 2 acting as a base; the terminal portion 6 extends beyond the lens 5 so as to protect it from damage in this disposition. A stand may also be provided for the device.

An additional switch arrangement may be provided to allow the alarm sounder 10 to be operated voluntarily, such that the device 1 may also be used as a personal attack alarm or the like, or to guide rescuers to the user.

In further embodiments of the invention, other forms of alarm device could also be included, such as a motion sensor, linked to the alarm sounder 10. The device may then be used as an anti-theft alarm, for example when stored in or attached to a pack or other luggage.

The invention has been described as being of particular use to travellers, which it is. However, it may also prove effective in general domestic environments.

